METAL SEPARATOR

Digital Y

Manual (English)

Digital Y Version 0701

1. General

1.1. Instructions for using the manual

This manual is valid for the Digital Y 50 and 70.

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This manual contains all the information that is of relevance for the operation.

Before commencing with work for the first time using the metal detector, this User Manual should be read and understood by all the persons who are authorized to work on and with the metal separator. Special stress should be placed on the Safety Information.

The User Manual is a component of the metal separator and must always be available for the reference of the authorized circle of people. Chapters of this manual should never be removed from the manual at any time. Replace missing manuals or missing pages immediately if lost, especially the "Safety Information" chapter.

Note:
Messrs Pulsotronic do not grant an implied guarantee for the customary quality and suitability for a specific utilisation purpose.

2. Area of Utilisation and Qualification

2.1. Intended use

The Digital Y 50 and 70 removes metal contaminations from free-flowing substances. Please ensure that the metal separator is not permitted to warm up to more than 50° C.

Note:

The Digital Y 50 and 70 removes metal contaminants by means of a separating drum from free-flowing in-situ piles of material, which are transported through the unit by dropping freely or as upright in-situ piles. The Digital 50 and 70 was developed to protect plastic injection moulding machinery, extruders or peripherals from metal contaminants of all kinds.

A small quantity of the 'good' material is also discharged during the separating process, although the reliable removal of metal is in the foreground and a slight loss of material is technically unavoidable.

It is necessary to observe a few marginal conditions and usage conditions in order that the device will function reliably. This manual will deal with these points. Thus, reading this manual is absolutely mandatory to ensure trouble-free operation.

The maximum response sensitivity to metals is subject to technical and physical limits (see Technical Data chapter). The Digital Y 50 and 70 is **not** suitable for removing metal in suction-type or pressure conveying lines.

The Digital Y 50 and 70 can be used to minimize damages due to metal contamination. Regular inspections of the devices are absolutely mandatory as components are involved, which could malfunction due to external influences or wear, in spite of the latest technology.

2.2. Improper use

The Digital Y 50 and 70 is not intended for any other types of uses other than those listed in 2 'Area of Utilization and Qualifications'; all other uses are considered improper uses! Please note that the following is forbidden:

- Removal or modification of the safety devices
- Using the metal separator for an unapproved use
- Converting the metal separator without Pulsotronic's permission in order to use it for another purpose, to add some other utilisation purpose. Bear in mind that you may be considered the manufacturer of the metal separator after such a conversion, along with all the consequences that are involved!

2.3. Owner/operator's duty of care

The Digital Y 50 and 70 Metal Separator has been designed and constructed according to harmonized standards. Thus, it complies with the latest technology and ensures the highest possible degree of safety. This safety can only be achieved in operational practice if all the required measures have been undertaken. Planning these measures and controlling their implementation belongs to the owner/operator's duty of care.

The owner/operator must safeguard the following, in particular:

- that the metal separator only be used for the intended purpose, (see 2 "Area of Utilization and Qualifications");
- that the metal separator only be operated when it is in a perfectly functioning condition and that the safety equipment in particular be examined at regular intervals to ensure it is functioning properly
- that the Operating Manual be available at all times and remain in good legible con-

dition
- that only adequately qualified and authorized staff operate, service and repair the metal separator
- that the personnel must be trained on all matters of occupational safety and environmental protection before starting to work with the unit for the first time and must be familiar with the Operating Manual and especially the Safety references contained therein
- that none of the safety and warning information that has been attached to the machine be removed and that they remain legible

3. General Safety Information

3.1. Explanation concerning utilized safety symbols

The following safety symbols are used in the Operating Manual concerned here. These symbols are mainly intended to draw the reader's attention to the text appearing beside the safety reference.

Danger!

This symbol indicates that there are dangers for life and limb.

Danger!

This symbol indicates that there are dangers for life and limb due to electrical voltage.

3.2. Fundamental safety measures

- Do not reach into the openings on the metal separator. Mechanical forces are created after switching on the pneumatically operated points, which could cause injuries.
- Always disconnect the device from the compressed air and voltage supply before performing any maintenance work. Please ensure that no one can re-connect the compressed air or voltage supply before the work is completed.
- Never put the metal separator into operation without the safety equipment required on the factory side. These include the safety grates over the moving parts, in particular.

- Immediately discontinue the operation if the safety equipment is not functioning properly or is damaged.
- If technical malfunctions occur during operation due to wear or fatigue, these must be rectified immediately.
- Set out a sufficient number of regular maintenance intervals.

Always observe the safety information which is located on the unit itself. They help to avoid dangers. Do not remove this information under any circumstances.

Do not put the metal separator into operation if you:

- have not been briefed completely by the owner/operator, or
- have not read this Operating Manual in full, or
- have not completely understood this Operating Manual.

Operating errors can result in serious personal or property damages.

Danger!

Avoid touching the electronic circuit board.

Disconnect the unit from the supply voltage and the compressed air supply before wiring the electronics onto other peripherals. You will avoid unintended electrical short circuits as a result of this. It is necessary to ensure that static charges dissipate before any possible work commences.

4. Operating Instructions for the Metal Separator

A trouble-free and safe operation of the Digital Y 50 and 70 Metal Separator is only possible, if the following points are observed.

4.1. Assembly instructions

- Fastening must be performed in such a way that none of the screws or other fastening materials can become loose unintentionally.
- The device may not be dismantled for assembly. The assembly must be carried out as a complete unit.
- No welding current may be allowed to flow through the housing on the metal separator under any circumstances! This can permanently destroy the metal separator!

4.2. Connection instructions

- Ensure the mains voltage is the proper one.
- Installation and connections may only be performed by trained staff.
- Observe the installation requirements for erecting and operating electrical plant (VDE 0100).
- Never carry out any work when the metal separator is switched on!
- Carry out all protective measures for persons and machinery in accordance with the circumstances and regulations.
- Take the capacities of the output contacts into consideration.
- The metal separator must be well grounded (avoid star-shaped earth circuits, shortest link to main earth).

4.3. Operating instructions

The metal separator should remain switched on at all times. That way, the electronic circuits have the longest service life.

4.4. Metal separator's interference protection

The metal separator's power input is protected against parasitic induction by the factory.

Even higher operational safety and additional protection against functional faults is achieved through the following measures:

- Use line filters, if the mains voltage is affected by switching on other large consumers {compensation systems, welding devices, HF furnaces, electromagnetic valves, etc.)

Protective circuitry for inductive loads (solenoids, gates, electromagnets) as a result of RC elements. High voltage peaks can result from shutting off inductive loads. These high voltage impulses are short-circuited by the RC elements.

5. Technical Data

Item designation	**Digital Y 50 (with 50 mm ring)**
	Digital Y 70 (with 70 mm ring)
Operating voltage	85 V – 264 VAC
Mains frequency	47 Hz - 440 Hz
Power consumption	< 40 Watt
Admissible operating temperature	0°C - 50 °C
Admissible product temperature	max. 60 °C (with compressed air cooling max. 100° C)
Weight	about 32 kg

Adjustable sensitivity (Max.)	**Digital Y 50**	0.5 Fe in centre of ring FE-St37
	Digital Y 70	0.7 Fe in centre of ring FE-St37
Material throughput	**Digital Y 50**	about 2,000 l/h
	Digital Y 70	about 5,400 l/h
	depending on overall conveyor system and conveyed material	
Sensitivity ranges	7	
Parts touching media	Hard or laminated paper and aluminium	
Operating pressure	4-6 bar filtered, water and oil-free	
Relay contacts	Metal detection (floating changeover contact 250V/1A)	
	Fault (floating changeover contact 250V/1A)	
Semiconductor output signals	Metal detection 24V / 20 mA, resistant to short-circuits	
Electronic housing paintwork	RAL 5005	
Dimensions	327.5 mm * 272 mm * 320 mm	

6. Technical Description

This chapter provides information on the configuration and way in which your metal separator operates.

The Digital Y 50 and 70 Metal Separator consists of three main functional units:

- Electronic unit with operator keyboard / Chapter 6.1.
- Ring detector with transmitter and receiver coils / Chapter 6.4.
- Pneumatically-operated separating drum / Chapter 6.5.

6.1. The operator keyboard

The operator keyboard is located on the outside of the blue control box. Faults are reported and sensitivity settings are displayed on this by LEDs (light emitting diodes). All the main settings are made at the press of a button. The LEDs are located vertically underneath each other on the operating keyboard, where the following operating modes are displayed.

Green LED “OPERATION”
The Digital Y 50 and 70 operates perfectly.

Red LED “Flap FAULT” (optional)

However, this function is an enhanced option and is not implemented in the basic unit.

The flap has not reached Rejects end position after the last metal detection. The Digital Y 50 and 70 cannot separate the detected metal. Once the separating drum has switched again properly after another metal detection, the error message is deleted automatically.

Rectification of the Flap fault

- Press the Reset button
- Check the compressed air supply and the compressed air level
- Check flap for pivotability

Red LED "Ring FAULT"
Signalizes a fault in the ring coil or the evaluation electronics. Once the cause of the fault is rectified, the LED goes out automatically and the device is operationally ready again.

Rectification of the Ring fault
Remove any electrically conductive items caught in the ring coil.
Check electric connections on the electronic circuit board.
Carry out visual inspection of metal separator.
Press the Reset button

Red LED "PRESSURE FAULT" (optional)
Signalizes a fault in the compressed air supply. However, this function is an expansion option and is not implemented in the basic unit.

Rectification of the Pressure fault
Check compressed air supply

NOTE: Some of the letters on the operator keyboard are interchangeable. With a pair of tweezers, carefully look for the extremely narrow gap on the right side of the operator keyboard. Lift the gap a little bit and pull out the lettering.

There are German, English and French letters for every device. The German lettering is fitted at the factory. You will find the other letter inserts inside the electronic housing.

6.2. Key functions

The Digital Y 50 and 70 is adjusted/set using four keys. There are no potentiometers to adjust. The commissioning is extremely simple for this reason.

The keys have the following functions:

TEST

- Brief activation triggers a metal detection. The separating drum briefly switches into the ejection position. This function is used to test the metal separator at the push of a button. Four light emitting diodes (LEDs) simultaneously display the currently set sensitivity value in the form of light combinations.

- Hold the key. The separating drum remains in the Eject position for as long as the key is depressed. Material samples can be removed out of the delivery flow this way. Thus, emptying a dosing unit or a mixer, which is mounted on the metal separator, can occur at the press of a button.

F1+

Brief activation displays the currently set sensitivity for 5 seconds (see Sensitivity Table, Chapter 7.4.). Extended pressing of the F1+ button increases the sensitivity, provided the maximum sensitivity has not been set already.

F2-

Brief activation displays the currently set sensitivity for 5 seconds (see Sensitivity Table, Chapter 7.4.). Extended pressing of the F1- button decreases the sensitivity, provided the minimum sensitivity has not been set already.

RESET

The key deletes a reported fault, once the cause for the fault has been rectified.

6.3. Setting the operating variables

There are four DIP switches on the electronic circuit board. These switches activate or deactivate some of the fundamental operating variables. The switch setting does not have to be changed in Normal mode.

	Function	**ON**	**OFF**
DIP 1	Operating frequency detector coil	295 kHz	290 kHz
DIP 2	Flap monitoring	ON	OFF
DIP 3	Reset saved	ON	OFF
DIP 4	Key interlock	ON	OFF

DIP 1:
If two metal separators are operated directly next to one another, two different operating frequencies must be set. This prevents a reciprocal fault.

DIP 2:
Activate / disable flap monitoring.

DIP 3:
After the first metal detection, the metal detection relay may stay energized. The relay only drops again after the Reset key is subsequently pressed. Although the relay remains energized after the first metal detection, the metal separator continues to work normally, i.e. the separating drum briefly returns into the Reject position every time metal is detected. The unit can be armed in this way so that a persistent alarm is received after the first metal detection, which remains until the user cancels the alarm by pressing the Reset key.

DIP 4:

Locks / releases the keyboard

6.4. Sensitivity Table

The current sensitivity setting is displayed by the four horizontally arranged yellow light emitting diodes on the front panel.

Example: After pressing the F- or F+ keys, diodes 3 and 4 are illuminated for approx 5 seconds. The current value for the response sensitivity equals 1.6 mm. That equals Level 6, i.e. very insensitive.

The metal piece is only discharged if it is larger than or equal to the currently set value.

Thus, the four light emitting diodes are used to set the precise sensitivity and as an orientation guide (see Table on next page).

As outlined in Chapter 6.2, the sensitivity is displayed or changed by pressing the keys F+ or F-, if no keyboard interlock has been activated.

The sensitivities refer to the most insensitive spot on the detector, which is the center in the case of these systems. The sensitivity always improves towards the edges.

Sensitivity level	**Sphere diameter FE-ST 37** (in mm) **50 mm / 70 mm ring**	X = LED illuminated			
		LED 1	**LED 2**	**LED 3**	**LED 4**
1 (most sensitive)	From 0.5 / 0.7	X			
2	From 0.6 / 0.8	X	X		
3	From 0.7 / 1.1		X		
4	From 0.9 / 1.5		X	X	
5	From 1.2 / 1.8			X	
6	From 1.6 / 2.5			X	X
7 (least sensitive)	From 2.0 / 3.2				X

Note:
For detection accuracy, it is irrelevant, whether metal parts are covered by material or not.

Non-magnetic metals affect the magnet field of the ring spool less intensely than magnetic ones. Thus, you should expect to use a reduced sensitivity for these metals.

The following applies for non-ferrous metals: The FE - St 37 value in the table multiplied by a factor of 1.3 equals approximately the sensitivity for a sphere made of non-ferrous metal.

The following applies for non-magnetic stainless steel: The FE - St 37 value in the table multiplied by a factor of 1.5 equals approximately the sensitivity for a sphere made of stainless steel.

6.5. Separating drum and separating time

The separating drum is located in the aluminium housing underneath the blue metal ring detector. The separating drum only becomes visible after removing the round cover plate on the housing. The separating drum is designed in such a way that piled or free-flowing bulk materials are directed either to the discharge outlet for good or reject material. If no metal is detected, the material flow continues to run vertically from the intake through the separating drum to the Good material discharge outlet. In this case, the material is not diverted.

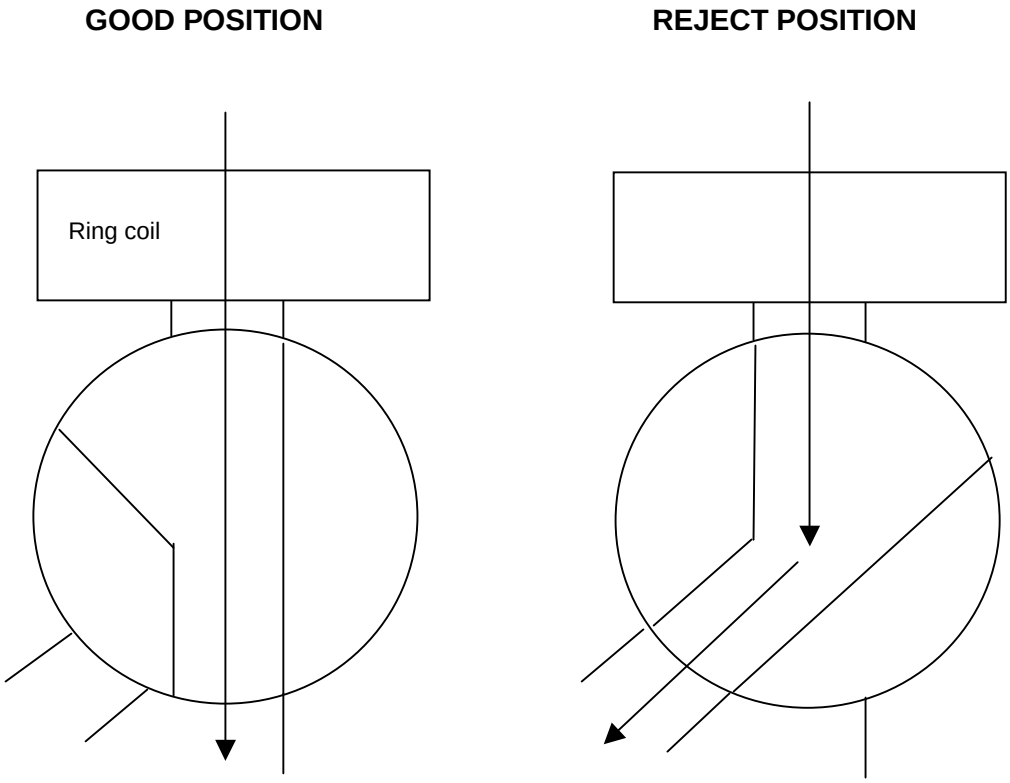


Illustration of two separating drum settings. The arrow identifies the direction of the material flow.

If metal is detected, the separating drum steers the material flow to the Reject discharge outlet.

To ensure that large metal pieces have sufficient time to leave the separating drum, the separating time is automatically adapted. Depending on the size of the metal, the separating drum remains in the Reject position for a longer or shorter period of time.

The advantages of this input signal are the reliable separation of large and small pieces of metal. This prevents the separator unit from becoming jammed up. The volume of rejected material is reduced to a minimum with this new technology.

After the variable time has elapsed, the separating drum switches back to the Good setting. If another piece of metal is reported during the separating process, the separating drum remains in the Reject position for a longer period of time.

It is not necessary to alter the separating time. Nevertheless, the separating time can be altered on the electronic circuit board using potentiometers (see Chapter 8.3 The electronic circuit board). A longer separating time means a greater loss of good material. The briefest separating time of approx 1 sec is preset at the factory. It is possible to extend this time to approx 4 to 5 sec.

6.6. Function and utilization limits

The Digital Y 50 and 70 metal separator works on a balanced measuring principle, which is briefly explained below.
The ring coil contains the following:

- a transmitter coil to generate a high-frequency magnetic field
- two receiver coils to capture the magnetic field

Upon activation, the electronics regulate the intensity of the transmitter coil's magnetic field so precisely that both receiver coils receive signals of almost the same intensity. The system is brought into balance.

When metal moves through the metal separator, this affects the magnetic field. As a result of changing the magnetic field, the electric currents in the receiver coils change. This process is called electromagnetic induction. The receiver coils become unbalanced.

The magnitude of the change in the (induced) current has a direct relationship with the magnetic and electric properties of the metal particles:

- Large metal participles induce a larger current than small metal particles
- Magnetic metals (e.g. steel) induce a larger current than non-magnetic metals (e.g. aluminium)

The current induced this way is measured by the electronics and is then processed and evaluated by a software program.

This measuring principle is suitable for all types of metal and this makes it possible to detect metal participles within product or in non-metallic packaging.

The examined products are not affected or changed in any way by this kind of measuring.

6.7. Product effects – bothersome product properties

This chapter explains:

- what is understood by the term ’product effect’
- why the metal separator reacts to a product effect

This knowledge will help you to use the best possible setting for the metal separator in order to avoid any spurious releases.

What is understood by the term ‘product effect’?

The metal separator reacts to magnetism and electric conductivity. Because of this, electrically conductive substances, as is the case with metal, will affect the measuring field. This results in a test signal for the electronics, similar to what occurs when metal is reported. This is referred to as a negative influence on the magnetic field due to product effects.

The result of the product effect is that metal is reported by the metal separator, although in reality, the product is metal-free.

Please keep in mind, for example, how salt changes the conductivity of water.

> The electric resistance of distilled water is infinitely high, provided the water is pure distilled water. Distilled water does not contain any salts or minerals.
>
> Dissolved salt changes the electric resistance so much, that the solution is electrically conductive. Similarly, some plastics have conductive properties due to the admixing of materials.

Raw materials are more or less electrically conductive. Components such as:

- Salt
- Sugar
- Minerals
- Moisture
- Carbons (plastic granulate died black)

cause the materials to be more or less conductive. This causes the magnetic field to be continuously affected. Although there are no metal particles in the examined material, the metal separator may still report metal. The results are unnecessary rejects.

The product effect takes on a characteristic value for every material. In practice, the achievable sensitivity is dependent on how well a potentially existing product effect can be compensated by the metal separator.

This model of the Digital Y 50 and 70 has no product effect fade-out (compensation) possibilities. Frequently, however, reducing the sensitivity is all that is required to avoid this bothersome effect. The achievable sensitivity for metal detection systems with integrated product effect compensation is considerably higher.

(Please ask our head office for product group M-Pulse or the Digital+ Extractor).

Suppressing product effects in the Digital Y 50 and 70:
A product effect can only be suppressed in the Digital Y 50 and 70 to a certain extent by reducing the sensitivity (see Chapter 6.2.).

Note: The intensity of the product effect is proportional to the material throughput. As a result of this, reducing the material throughput with critical materials can also result in a reduction in the bothersome effects.

7. Transportation

7.1. Safety information for transit and assembly

Danger! To avoid machine damages or life-threatening injuries during transit and the installation of the metal separator, please absolutely observe the following points:

- Transportation and assembly work may only be carried out by qualified persons complying with the safety instructions. Take the following weights into consideration when selecting suitable load-bearing equipment:
  à Metal separator, depending on size and model, to 32 kg approx.
- Protruding, sharp edges can result in injuries due to cuts.
- Suspended loads can drop down, causing mortal danger!
  Never stand underneath a suspended load!
- Parts that are loosely lying on top of each other can slip and fall down.
- Also read the Chapter entitled "General Safety Information".

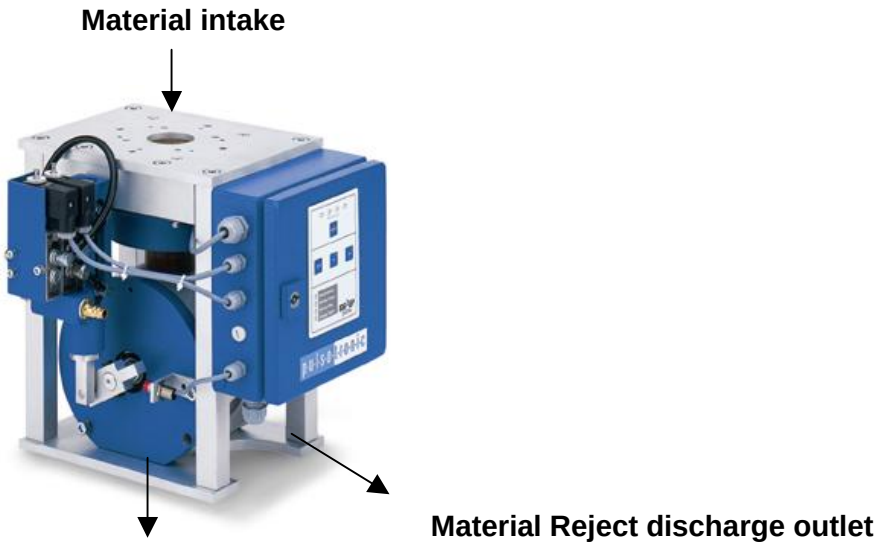
8. Assembly Instructions

8.1. Assembly

In principle, the following connections with the conveyor system and the Digital Y are required.

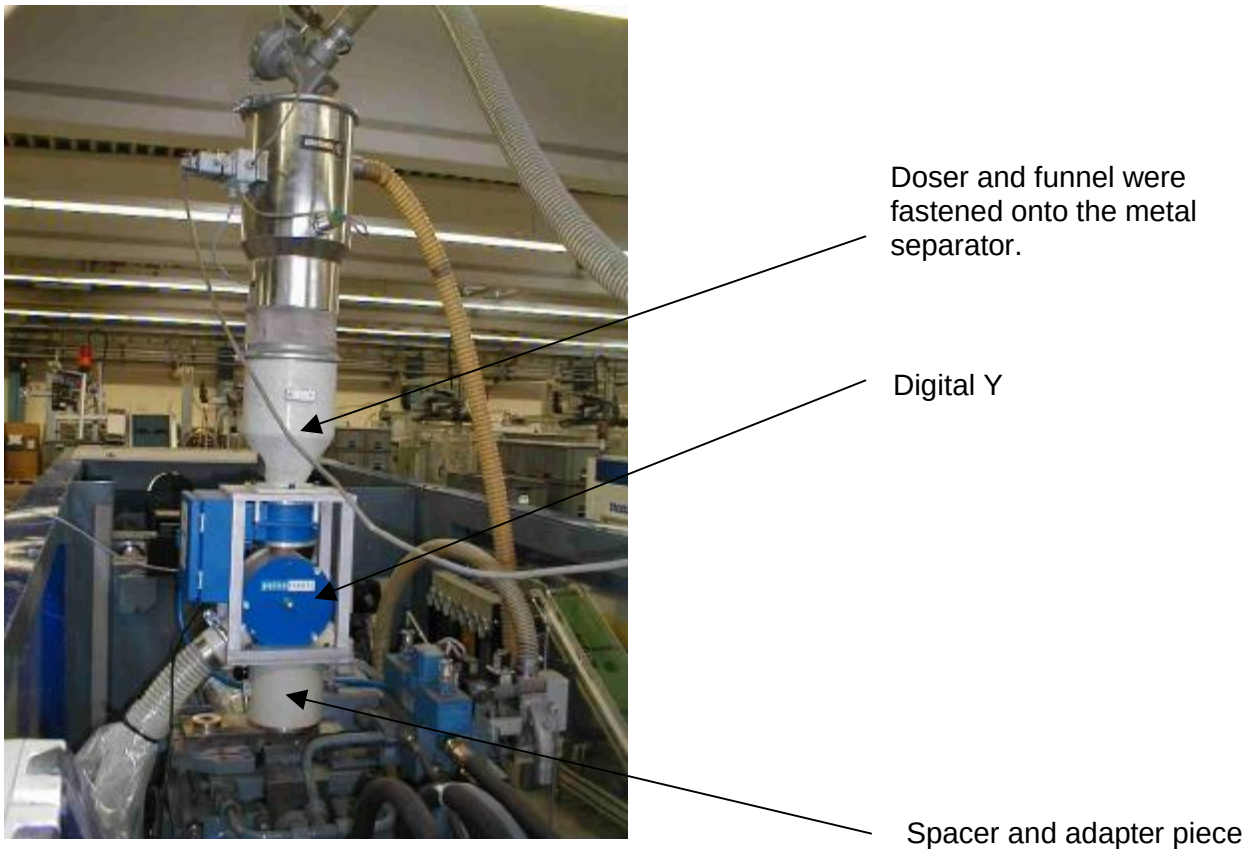
1. In principle, the material feed is connected to the Digital Y's intake.
2. The material withdrawal is connected to the Digital Y's Good discharge outlet.
3. The Reject material discharge is connected to a collection hopper or a similar system.
4. Possible existing mixers or dryers are mounted on the Digital Y.

The Digital Y must be assembled vertically. In addition, mechanical vibrations must be avoided as these can generate a false metal alarm.



8.2. Application example

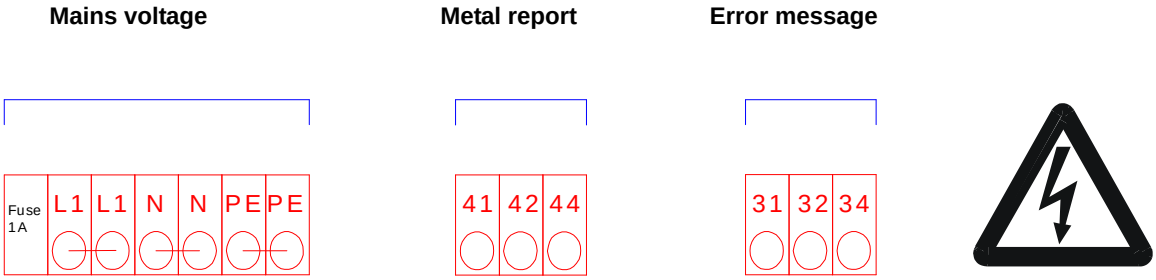
The metal separator here was assembled directly on an injection moulding machine and directly monitors the plastic granulate during the material feed.



8.3. Electric connection

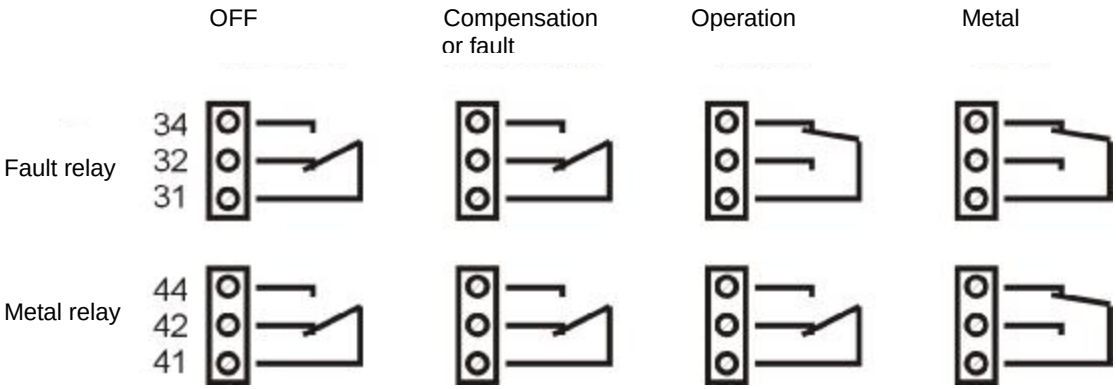
The terminal strip is located in the control box and is accessible after opening the housing door. The terminals are suitable for cable cross-sections of up to 1.5 mm^2.

Lines appearing in bold identify terminals, which can be connected by the user.



The connecting terminals for the relay on the power supply circuit board are wired as follows and have the switching states shown below during operation:

Switching states of relays



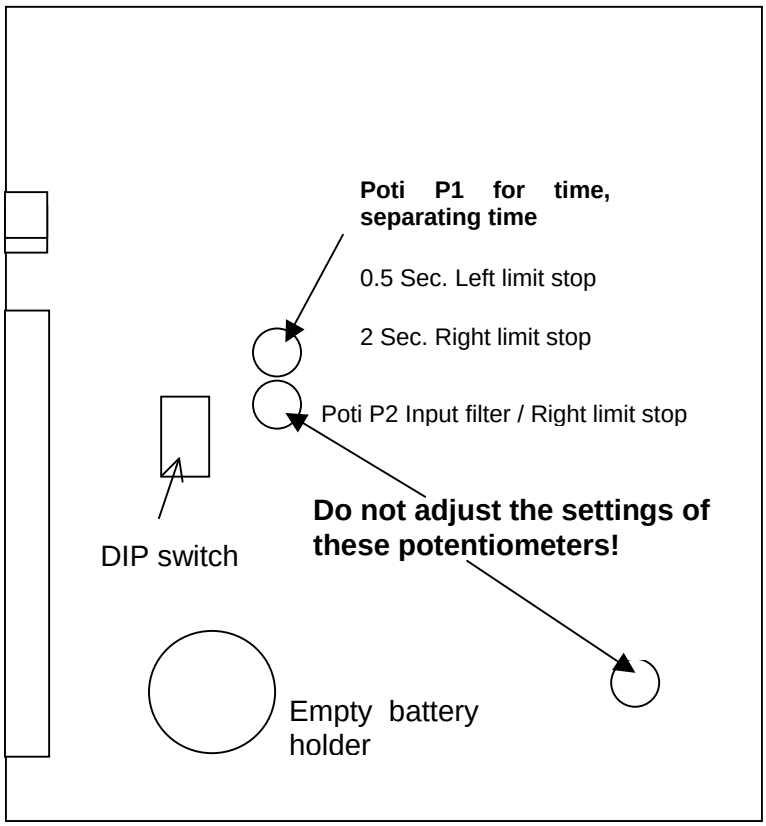
Terminal Configuration			
Terminal	**Description**	**Function**	**Technical Data**
1+ 2	Digital input 1	Closer	not available
3 + 4	Digital input 2	Closer	not available
5 + 6	Compressed air control	Closer	not available

Terminal Configuration			
Terminal	**Description**	**Function**	**Technical Data**
7 8 9	Proximity initiator – Flap monitoring	PNP input +24 V Minus	connected by factory
10 + 11	Monitoring of solenoid connection	optionally required	connected by factory
12 + 13	Flap solenoid	optionally required	connected by factory
14 **15**	**Semiconductor output – metal detection**	**+24V output** **Minus**	**withstands load of 20 mA, short-circuit resistant**
16 17	Solenoid blow-off function	optionally required	connected by factory
18 19 20 21 22	Interface		not available
23/24/25	Analog inputs		not available
31 **32** **33**	**Relay fault**	**In the event of a fault, terminals 31 – 32 are closed, 31-34 open**	**Floating two-way contact** **Withstands 250 V / 1 A**
41 **42** **44**	**Metal Relay**	**With metal detection, terminals 41-42 are closed, 41- 44 are open**	**Floating two-way contact** **Withstands 250V / 1 A**
L1 NPE	Voltage supply		85 V - 265 V 47 Hz - 440 Hz Power consumption < 40 VA
Fuse			0.5 A inert 5*20

8.4. The electronic circuit board

There is a blue box on the housing of the Digital Y 50 and 70, which contains the electronic circuit board. It consists of two circuit boards located on top of each other. The lower circuit board is responsible for the voltage supply. The upper circuit board handles the evaluation of the test data and controls all the external components. Inspections or repairs are only possible at the factory. The electronics are maintenance-free and test themselves for correction functions. A relay is activated in the event of faults. We recommend connecting a signal transmitter here so that potential faults are noticed immediately.

There are four red DIP switches for setting various operating variables located on the circuit board (see Chapter 6.3). There are also three potentiometers on the circuit board. One potentiometer is used to set the separating time. In the standard model of the Digital Y 50 und 70, there is no battery in the battery holder. The connection between the ring detector and the circuit board is firmly soldered and may not be separated or altered.



8.5. Delivered state

Factory settings:

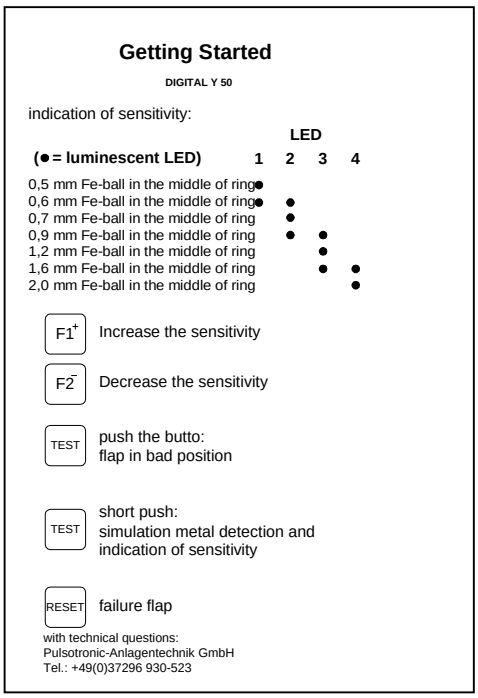
- Ø Sensitivity Level 3 (corresponds to a FE sphere, 0.7 mm (50mm) / 1.1 mm (70mm model)
- Ø Separating time of approx 0.5 sec.
- Ø Input filter maximum detection speed

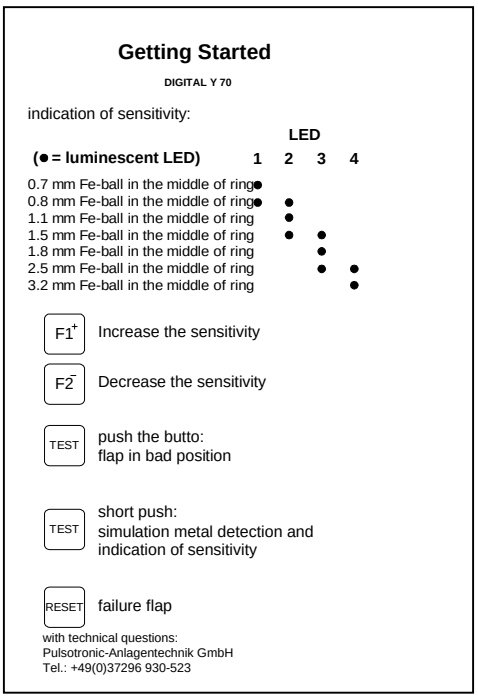
- Ø Operating frequency of ring detector 295 kHz (DIP1 = ON)
- Ø Flap monitoring activated (DIP2 = ON)
- Ø Metal Reset externally disabled (DIP3 = OFF)
- Ø Keyboard interlock disabled (DIP4 = OFF)
- Ø Compressed air monitoring is disabled (by jumper on terminals 5 and 6)
- Ø No battery

8.6. Getting Started

This is located on the inside of the door of the blue control box. It describes the main functions and includes an abbreviated Sensitivity Table.

Digital Y 50 and 70 keyboard:





9. Commissioning

Commissioning is very simple. However, check the following points once again:

- Inspect all the hose / pipe connections to make sure they are tight.
- Make sure that the threshold values for the supply voltage and compressed air are observed.
- Observe the safety information and assembly instructions
- Close the door and ensure that no one can open the device when it is in operation.

- After a brief moment, you will be able to hear the separating drum switch into the “good“ position
- Then re-start the material conveyor
- If the device reacts too frequently, refer back to the information in the Product Effects chapter and adapt the sensitivity to the material you are conveying.
- Re-setting of the sensitivity may be required after a material changeover, if the material properties have changed greatly or the device reacts too frequently.
- In most cases, too frequent switching is the result of conductive admixtures in the plastics. Adapting the sensitivity (responsiveness) may be required then.

Place your confidence in the units and investigate the causes if the units sift frequently.

With many applications, we have found that you may not get any metal report for days on end. Then, suddenly the device reacts several times in succession for an extended period of time. If this is the case, do not reduce the sensitivity immediately, but look for metals in the rejects and if you are successful, look for the causes.

If there is metal in the plastic granulate due to broken off granulating mill knife pieces, then these will be distributed through a special smaller volume of granulate. Maybe you just caught an octabine with material containing many of these little pieces and the metal detector reacts much more frequently because of the poor quality of this batch of material.

Only reduce the sensitivity if you are really sure that the frequent switching occurrences are due to product effects.

Granulate highly contaminated with metal will result in the fact that the metal separators discharge a great deal of material (depending on the sensitivity level that is set) and that the machines receive too little material. In that case, the strongly contaminated material should be cleaned through a separate metal collector first and then returned to production.

Strongly contaminated material will cause the entire production sequence to malfunction from a certain degree onwards. There is a high degree of probability that continuous production will no longer be possible then.

10. Maintenance

10.1. General maintenance

The metal separator is a sensitive test device. The assembly and operation are described in this Operating Manual. Normally, the metal separator will work safely and reliably with-

out requiring any further adjustments after commissioning. It is however largely dependent on the conditions of use, and whether and when parts of the metal separator have to be replaced or if any setting adjustments are necessary.

The paper-based laminate tube and the separating filter should be examined for wear at regular intervals in any case. During the processing of fiberglass reinforced materials or strong abrasive materials, this maintenance interval should be shortened. The exact maintenance intervals can be assessed better during the course of operation. Carry out daily or weekly checks at the beginning.

The walls of the brown paper-based laminate tube become especially thin due to strong abrasion. The paper-based laminate tube should be replaced before abrasion results in the formation of a hole. The highly sensitive ring coil body protects against damages. If this instruction is not observed, the ring detector may be permanently damaged and will need to be completely replaced.

10.2. Removing the separating drum

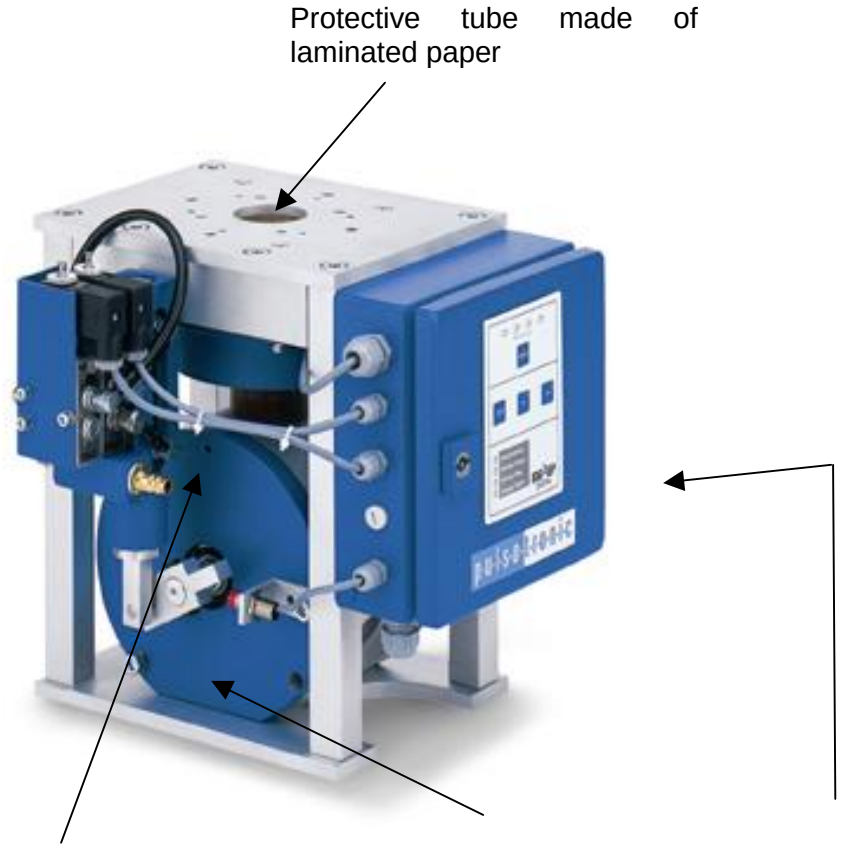
The separating drum can be removed as a complete unit. The metal separator must **not** be dismantled from the system for this purpose. Just lock the material feed, the voltage supply and remove the compressed air from the device (also see Section 3.2 Safety measures).

Unscrew the three socket head screws on the cover plate (see **B** below). By pulling out the cover plate horizontally, the separating drum also loosens itself from the unit. Pressing a screwdriver between the cover plate and the housing simplifies the removal.

During installation, it is necessary to ensure that the separating drum be aligned in such a way that the shaft catches in the guide inside the interior of the housing.

10.3. Removing the laminated paper protective tube

Once the separating drum is removed, the protective tube is released by undoing two screws (see Item **A**). The protective tube then falls downwards into the open unit. The two screws are retightened after inserting the new protective tube.



A. Unscrew the screw located here and the one on the opposide side to loosen the protective tube towards the bottom.

B. A second cover plate, visible here on the left, is located on the back (see arrow). The plate on the back must be undone in order to be able to remove the separating drum on the back.

10.4. Regular inspections

Regular inspections on the devices are absolutely mandatory in spite of the high quality of the components involved, which could malfunction due to external influences or wear.

An inspection of the separator must be carried out weekly and after maintenance stops or after performing any repair work. In the event that malfunctions do occur, these must be rectified **immediately,** otherwise the machines or products which are protected by the metal separator will have to be taken out of operation.

A metal signal is triggered after pressing the test button and the unit discharges material. The function of the unit can be tested in this way within a few seconds.

We recommend testing the Digital Y 50 and 70 metal detector regularly with a defined piece of test metal and recording the test results in a log book.

At this time, we would also like to refer to our range of accessories, with a multitude of suitable standards test spheres.

- The **test metal piece** should consist of a sphere with the tiniest diameter that can still be displayed. For test purposes, the spheres traverse through the metal separator together with the product and one observes, whether a metal signal follows.
- The **test plan** sets out when the metal separator is to be inspected, and by whom. For example: The shift electrician is to test the metal separator with the test metal piece one hour after the beginning of every shift. The test result is then recorded along with the date, time and signature in the log book. Example: Test sphere 1.5 mm FE detected, 24. August 2007, 08.30, signed Meier.
- In the event of a defect in the ring coil or the electronics, repairs are only possible at the factory. The ring coil is completely encapsulated with synthetic resin and is manufactured and tested in a complex process. The coil is then connected to the electronics. A series of function tests follow over several days. The units are only approved and shipped out once all the test results are successful. Repairs are therefore not possible on site. We would be pleased to provide you with a replacement unit following prior arrangements for the interim period.

We have special tools at our factory with which we carry out adjustments and assembly work on the individual parts in the Digital Y 50 and 70 metal detectors. Only then can we guarantee the units will function perfectly upon leaving our factory.

All the warranty entitlements become null and void if the user has personally tampered with the unit. If you notice any damages or faults on the units, let us carry out the inspection and repairs at the factory.

Repairs frequently appear to be very simple at first glance, but fundamental things can be overlooked. Years of experience and technical patents are embodied in the units, which make them so high quality and reliable.

This will save you consequential damages due to improperly carried out repairs or maintenance work.

11. Faults and causes of errors

Frequent causes for malfunctions are incorrect settings or a lack of care with connections. Please isolate the cause of the fault using the following table. Frequently the malfunction is caused by a minor detail. If all attempts remain unsuccessful, jot down the unit number (can be found on the type plate, which is blued onto the frame) and get in touch with us.

Observation	Cause	Remedy
• Irregular, very frequent metal reports.	• Check installation site: Loose screws? • Sensitivity level too high on metal separator. • Product effects?	• Check screws to ensure they are properly fastened • Reduce sensitivity
• Device trips again and again after detecting metal • Ejections whenever there are strong vibration/jarring	• Severe metal contamination • Excessive pressure on pneumatics causing strong vibration/jarring • Strong impacts or vibrations/jarring	• Possible black granulate, conductive product properties for material • Check rejects again for metal contamination • Test compressed air level - 4-6 bar • Install pressure reducer • Minimize cause of impacts
• Metal reports at same time as inductive or capacitive consumer switches.	• Missing interference suppression on external components.	siehe 4.2. Connection Instructions and 4.4 Metal separator's interference protection
• No metal report, although metal falling through ring detector.	• Sensitivity setting too low • Test object too small	• Increase sensitivity • Test another test object
• Malfunction in ring • Malfunction - flap • Malfunction – compressed air • No equipment-on indicator	• Dirty ring • Large piece of metal got caught in ring • Sticking or stiff separating drum • Compressed air failure or pressure too low • No mains voltage • Fine-wire fuse (0.5 A inert) tripped	• Clean ring • Check compressed air 4-6 bar • See Chapter 6.1 • Check mains voltage • Replace fuse

What if the fault cannot be rectified?

Contact Pulsotronic : see 13. Appendix

12. Spare Parts

Ring Y 50	8611-90
Catalyst tube Y 50	8611-34
Pneumatic cylinder Y 50	0106056
Shunt housing Y 50	8611-22
Bearing piece Y 50	8611-41
Ring Y 70	16720000030
Catalyst tube Y 70	16520000110
Pneumatic cylinder Y 70	16520000111
Shunt housing Y 70	16520001006
Bearing piece Y 70	8611-411
Pre-assembled plug	16720078215
Solenoid coil	0106055
Solenoid valve	0106015
Ball bearing	8611-80
Shaft for turning mechanism	8611-24
Clevis	0106054
Bolt for clevis	8611-82
Friction bearing bushing	8611-54
Bearing plate	8611-06
BG circuit board	16120420050
Power supply	16120220050

13. Appendix

In the event of technical questions, please speak to the Customer Service department or Technical Sales at Head Office.

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